

REMARKS

This application has been reviewed in light of the Office Action dated October 6, 2004. In view of the foregoing amendments and the following remarks, favorable reconsideration and withdrawal of the rejections set forth in the Office Action are respectfully requested.

Claims 1-4, 6, 8, 10, 12, 14, 18, 19, 21, 23, 25, 26, 28, 30, 32, 34, 35, 37 and 39 are pending. Claims 40 and 41 have been cancelled herein without prejudice to or disclaimer of subject matter. Claims 1, 6, 21, 25, 26, 28, 30, 32, 34 and 35 have been amended. Support for the claim changes can be found in the original disclosure, and therefore no new matter has been added. Claims 1, 6, 21, 25, 26, 30, 34 and 35 are in independent form.

Claims 1, 6, 21, 25, 26, 30, 34, 35, 40 and 41 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,970,446 (*Goldberg et al.*). Claims 1, 2, 4, 6, 8, 21, 25, 26, 30, 34, 35 and 39 were rejected under 35 U.S.C. § 102 (e) as being anticipated by U.S. Patent No. 5,749,068 (*Suzuki*). Claims 3, 10, 23, 28, 32 and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Suzuki* in view of U.S. Patent No. 5,293,588 (*Satoh et al.*). Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Suzuki* in view of *Satoh et al.* and further in view of U.S. Patent No. 4,907,274 (*Nomura et al.*). Claims 14 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Suzuki* in view of U.S. Patent No. 4,922,538 (*Tchorzewski*). Claim 19 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Suzuki* in view of *Satoh et al.* and further in view of *Tchorzewski*. Applicants respectfully traverse these rejections, but have nonetheless amended Claims 1, 6, 21, 25, 26, 30, 34 and 35 to more clearly define over the cited art.

The present invention relates to environment adaptation for speech recognition.

In a conventional speech recognition system, a speech input terminal transmits inputted speech data to a speech recognition apparatus through a network and the speech recognition apparatus executes speech recognition for the speech data. In such a system, because users, speech input terminals, and circumstances can all vary, adaptation of the speech recognition to an environment at the side of the speech input terminal is needed.

According to the present invention recited in the independent claims, the speech input terminal creates a model for environment adaptation for speech recognition and transmits the model to the speech recognition apparatus. Therefore, it is not required to prepare various models in the speech recognition apparatus in advance, and, advantageously, real-time environment adaptation for speech recognition can be achieved, providing a result that has accounted for an environment at the side of the speech input terminal at that time.

Independent Claim 1 of the present invention, as amended herein, recites a speech input terminal in a speech communication system including the speech input terminal for transmitting inputted speech data to a speech recognition apparatus through a network, and the speech recognition apparatus executing speech recognition processing for the speech data transmitted from the speech input terminal. The speech input terminal includes speech receiving means for receiving speech data from speech input means, creating means for creating a model based on information representing an operation environment, the model being for environment adaptation for speech recognition in the speech recognition apparatus, and communication means for transmitting the model and the speech data to the speech

recognition apparatus and for receiving the results of the speech recognition executed on the basis of the model by the speech recognition apparatus.

Independent Claim 6, as amended, recites a speech recognition apparatus in a speech communication system (generally corresponding to the speech communication system described in Claim 1). The speech recognition apparatus includes speech recognition means for executing speech recognition processing for the speech data transmitted from the speech input terminal through the network, and means for receiving a model for environment adaptation for speech recognition from the speech input terminal, the model being created by the speech input terminal based on information representing an operation environment thereof. The speech recognition means executes speech recognition processing on the basis of the model.

Independent Claim 21, as amended, recites a speech communication system (generally corresponding to the speech communication system described in Claim 1). In the system, the speech input terminal includes speech receiving means for receiving speech data from speech input means, creating means for creating a model based on information representing an operation environment, the model being for environment adaptation for speech recognition in the speech recognition apparatus, and communication means for transmitting the model and the speech data to the speech recognition apparatus and for receiving the results of the speech recognition executed on the basis of the model by the speech recognition apparatus. The speech recognition apparatus comprises means for executing speech recognition processing on the basis of the model.

Independent Claims 25, 26, and 30 are method claims reciting features that generally correspond to those recited in Claims 1, 6, and 21, respectively.

Independent Claims 34 and 35 are storage medium claims reciting features that generally correspond to those recited in Claims 1 and 6, respectively.

Accordingly, as recited in each independent claim, a model for environment adaptation for speech recognition in the speech recognition apparatus is created by a speech input terminal based on information representing an operation environment and is transmitted to the speech recognition apparatus.

Applicants submit that at least these features are not taught or suggested by the cited documents.

*Goldberg et al.* is directed to an apparatus and method for the robust recognition of speech during a call in a noisy environment. *Goldberg et al.* teaches that various background noises such as city noise, traffic noise, and airport noise are modeled by modeling device 10 and the noise models are stored in storage device 20. When a call is placed, background noise is recorded and analyzed to determine which noise model is most appropriate. Speech recognition is then carried out using that model.

*Goldberg et al.*, however, is not read to teach or suggest that the modeling device 10 is at a speech input terminal. While the exact location of the modeling device 10 is not specified by *Goldberg et al.*, Applicants understand the reference to teach that the noise model is created by another device, and that the speech input terminal of *Goldberg et al.* transmits only speech data and noise. If this were not the case, there would be no need for storing in

advance various noise models in the storage device 20 and then selecting appropriate the noise model from the storage device 20 during speech recognition.

Accordingly, Applicants submit that the independent claims patentably define over *Goldberg et al.*, and reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b) are respectfully requested.

*Suzuki* is directed to a speech recognition apparatus and a speech recognizing method for speech which is uttered in noisy circumstances and wherein noise is superimposed. In *Suzuki*, a speech recognition apparatus 100 is configured such that an acoustic analyzer 11 performs acoustic analysis for a noise-superimposed speech signal 200 input from an input terminal 1 and outputs a time-series feature vector 120 of noise-superimposed speech. A superimposed-noise estimating unit 15 estimates superimposed noise of the time-series feature vector 120 by using a noise model 121 stored in the noise model memory and a noise-free speech model 122 stored in the speech model memory. Then, the superimposed-noise estimating unit 15 outputs an estimated super-imposed-noise spectrum 5.

*Suzuki*, however, is not read to teach or suggest creating a model for environment adaptation for speech recognition in the speech recognition apparatus at a speech input terminal and transmitting the model to a speech recognition apparatus. In the system of *Suzuki*, the models are used for removing noise from an analyzed parameter and the models are stored in the speech recognition apparatus. In *Suzuki*, therefore, when acoustic signals are transmitted from a speech input terminal to a speech recognition apparatus, no model is transmitted by the speech input terminal because the speech recognition apparatus already has the model.

Accordingly, Applicants submit that the independent claims patentably define over *Suzuki*, and reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(e) are respectfully requested.

*Satoh et al.*, *Nomura et al.*, and *Tchorzewski* were cited for teaching features of the dependent claims. For instance, *Satoh et al.* was cited for its teaching of a quantization table. *Nomura et al.* was cited for its teaching of a distribution, and *Tchorzewski* was cited for its teaching of multiple terminals. These references, however, are not read to teach or suggest creating a model at a speech input terminal and transmitting the model to a speech recognition apparatus. Therefore, the proposed combinations of *Satoh et al.*, *Nomura et al.*, and *Tchorzewski* with *Suzuki*, even if proper, still fail to teach or suggest Applicants' claimed invention. Thus reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are respectfully requested.

Accordingly, Applicants submit that the invention as set forth in independent Claims 1, 6, 21, 25, 26, 30, 34 and 35 is patentable over the cited art. In addition, dependent Claims 2-4, 8, 10, 12, 14, 18, 19, 23, 28, 32, 37 and 39 set forth additional features of Applicants' invention. Independent consideration of the dependent claims is respectfully requested.

In view of the foregoing amendments and remarks, Applicants submit that the application is in condition for allowance. Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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